



# RAILROAD COMMISSION OF TEXAS

## HEARINGS DIVISION

**OIL & GAS DOCKET NO. 08-0288702**

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**THE APPLICATION OF OCCIDENTAL PERMIAN, LTD. PURSUANT TO STATEWIDE RULE 36 AND STATEWIDE RULE 46 FOR A PERMIT TO INJECT FLUID CONTAINING HYDROGEN SULFIDE INTO A RESERVOIR PRODUCTIVE OF OIL OR GAS; MIDLAND FARMS UNIT, WELL NOS. 366W, 382A, 392W, AND 461W; MIDLAND FARMS FIELD; ANDREWS COUNTY, TEXAS**

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**HEARD BY:** Brian Fancher, P.G. – Technical Examiner  
Laura Miles-Valdez - Legal Examiner

**APPEARANCES:**

**APPLICANT:**

John Soule  
Elizabeth Casbeer  
Pete Maciula  
Matthew Kanitz

**REPRESENTING:**

Occidental Permian, Ltd.

**EXAMINERS' REPORT AND RECOMMENDATION**

**STATEMENT OF THE CASE**

This application is unopposed and Occidental Permian, Ltd. ("Applicant or OP") was the only party present at the hearing.

Applicant requests a permit to dispose of oil and gas waste in the Midland Farms Unit ("Unit"), Well Nos. 366W (API No. 42-003-30203), 382A (API No. 42-003-38810), 392W (API No. 42-003-31058), and 461W (API No. 42-003-31955) ("subject wells" or "wells") pursuant to Statewide Rule 36 (*Oil, Gas, or Geothermal Resource Operation in Hydrogen Sulfide Areas*) and Statewide Rule 46 (*Fluid Injection into Productive Reservoirs*). Applicant requests to inject hydrogen-sulfide gas ("H<sub>2</sub>S"), carbon-dioxide ("CO<sub>2</sub>"), and natural gas ("HC<sub>G</sub>") produced from the subject field into its respective reservoir. The subject wells are currently authorized to inject freshwater from the Ogallala Santa Rosa Aquifers, and saltwater and brackish water (*i.e.*, produced water) from the Grayburg Formations. In addition, one of the subject wells is currently authorized to inject a polymer material.

The wells have been drilled and completed, and are reportedly located 15 miles southeast from Andrews, Texas. Gardendale, Texas is the nearest city located to the wells at about 7.5 miles away.

Statewide Rule 36 does not define “affected persons” in conjunction with the application, a notice of application (“NOA”), or notice of public hearing to be issued. Nonetheless, on January 31, 2014, Applicant provided NOA for the subject wells in accordance with Statewide Rule 46(c)(1) to the following person/entities: (1) surface owner of the well’s tract (*i.e.*, Fasken, Ltd.); (2) oil and gas operators within one-half mile of the well’s location (*i.e.*, Fasken, Ltd. and Applicant); and (3) the Andrews County Clerk. Applicant also published notice of the application on January 25, 2014, and May 11, 2014, in the *Odessa American*, a newspaper of general circulation in Andrews County, Texas.

### **GOVERNING STATUTES AND COMMISSION RULES<sup>1</sup>**

#### **Statewide Rule 36 [16 Tex. Admin. Code §3.36]**

In general, Statewide Rule 36 applies to each operator who conducts operations associated with hydrocarbon fluids that contain H<sub>2</sub>S as a gas constituent, where H<sub>2</sub>S is encountered through field production, transportation, and handling of said hydrocarbon fluids.<sup>2</sup> The subject application falls within the applicability of Statewide Rule 36 and must provide safeguards to protect the general public from the harmful effects of H<sub>2</sub>S. Specifically, Statewide Rule 36(c)(10) states:

(A) Injection of fluids containing hydrogen sulfide shall not be allowed under the condition specified in this provision unless first approved by the commission after public hearing:

- i. where injection fluid is a gaseous mixture, or would be a gaseous mixture in the event of a release to the atmosphere, *and* where the 100 ppm radius of exposure is in excess of 50 feet and includes any part of a public area except a public road; *or*, if the 500 ppm radius of exposure is in excess of 50 feet and includes any part of a public road, *or* if the 100 ppm radius of exposure is 3,000 feet or greater;
- ii. where the hydrogen sulfide content of the gas or gaseous mixture to be injected has been increased by a processing plant operation.

*(emphasis added)*

#### **Statewide Rule 46**

Statewide Rule 46 requires that a permit be approved to conduct fluid injection operations in a reservoir productive of oil, gas, or geothermal resources. If no protest from any

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<sup>1</sup> The Commission’s Statewide Rules 36 and 46 were the only rules considered; however, the subject well is not limited to Rules 36 and 46, and is required to comply with any and all applicable Commission regulations.

<sup>2</sup> See 16 Tex. Admin. Code §3.36(a).

affected person is received by the Commission, the Commission's delegate may administratively approve the application without the need for a public hearing.<sup>3</sup> Statewide Rule 46(c)(5)(B) defines "affected persons" as:

[A] person who has suffered or will suffer actual injury or economic damage other than as a member of the general public or as a competitor, and includes surface owners of property on which the well is located and commission-designated operators of wells located within one-half mile of the proposed disposal well.  
(emphasis added)

### **DISCUSSION OF THE EVIDENCE**

The subject application is Applicant's initial request to inject H<sub>2</sub>S in the subject field through the subject wells. As a result, a public hearing is required by rule because the application includes disposal of H<sub>2</sub>S where the 100 part per million ("ppm") radius of exposure ("ROE") of H<sub>2</sub>S exceeds 3,000 feet.<sup>4</sup> All persons required to be noticed of the subject application were provided notice in accordance with Statewide Rule 46. Statewide Rule 36, which is the governing rule that requires a public hearing in this instance, does not contemplate "affected persons" in the instant case nor does it offer any guidance as to what Applicant must prove to be granted authority pursuant to Statewide Rule 36(c)(10). In other words, although a hearing is required by Statewide Rule 36(c)(10), it offers no legal or technical requirements or guidance as to what must be shown to obtain authority from the Commission to inject H<sub>2</sub>S. Applicant identified three Commission-approved applications which involved injection of H<sub>2</sub>S.<sup>5</sup>

On January 31, 2014, Applicant submitted amended Forms H-1 (*Application to Inject Fluid Into a Reservoir Productive of Oil or Gas*) and H-1A (*Injection Well Data*) to add H<sub>2</sub>S, CO<sub>2</sub>, and HC<sub>G</sub> injection fluid-types to the existing waterflood project, which comprises the relief sought in the immediate case. Generally, the wells were granted authority to inject freshwater and produced water through separate applications approved on May 13, 2006, and March 11, 2008. The subject application was rendered administratively complete by the Commission's Oil & Gas Division and no protest in opposition was received by the Commission.

Ms. Elizabeth Casbeer testified as a fact witness on behalf of the Applicant. Ms. Casbeer is employed with OP as a Senior Regulatory Advisor. Ms. Casbeer testified that the initial administrative application was filed on February 14, 2014. The application contains Commission Forms H-1 and H-1A, Service List, 1/2-mile area-of-review (AOR) map, and a copy of the newspaper clip and publisher's affidavit for the publication made on January 25, 2014.<sup>6</sup> In addition, a copy of the newspaper clip and publishers affidavit for the application's May 11, 2014 publication was also submitted into the record.<sup>7</sup>

<sup>3</sup> See 16 Tex. Admin. Code §3.46(c)(6).

<sup>4</sup> See 16 Tex. Admin. Code §3.36(c)(10)(A)(i).

<sup>5</sup> See Oil & Gas Docket Nos. 8A-0280186, 8A-0275950, and 8A-0280210.

<sup>6</sup> OP Exh. No. 1.

<sup>7</sup> OP Exh. No. 16.

Applicant submitted a copy of the Oil Proration Schedule for the Field, which was discovered in February 1945. Ms. Casbeer testified that OP is the only operator in the Field with producing property (*i.e.*, the Unit).<sup>8</sup> OP operates just under 500 wells on the Unit. Basic Energy Services, L.P. is listed on the proration schedule with one well, the Midland Farms Brine Station Well No. 1 (API No. 42-003-85082).

The subject wells are currently authorized to inject fluids into the proposed injection interval through a Commission-approved waterflood project (Project No. F-1488 / 8-45677). The wells are located near the center of the Unit, which includes roughly 16,000-acres.<sup>9</sup> Ms. Casbeer testified that the subject application was filed for two reasons: (1) to amend the subject wells' existing injection authority by adding H<sub>2</sub>S, CO<sub>2</sub>, and natural gas as injection fluid-types; and (2) to amend the subject wells' existing surface injection pressures.<sup>10</sup>

In support of its position, Applicant submitted a copy Oil and Gas Final Order No. 126 (Docket No. 8-45,410), which authorizes the unitization agreement for the Field. A copy of Oil and Gas Final Order No. 126 (8-45,677) was also submitted, which authorizes a water injection pressure maintenance operation in the Grayburg Formation underlying the Field. Ms. Casbeer testified that the Unit's production is from the Field, which includes the Grayburg Formation.<sup>11</sup>

### Injection Fluids

Applicant's existing waterflood injection project on the Unit is made of roughly 225 injection wells. Ms. Casbeer testified that Well Nos. 366W and 392W are currently permitted to inject a maximum of 5,000 barrels per day ("bbl/day) of salt water and brackish water, 100 bbl/day of fresh water from the Ogallala Aquifer and 1,500 bbl/day of fresh water from the Santa Rosa Aquifer through the injection interval from 4,500 feet to 5,000 feet. Similarly, Well No. 382A is permitted to inject a maximum of 5,000 bbl/day of salt water and surfactant polymer, 100 bbl/day of freshwater from the Ogallala Aquifer and 1,500 bbl/day of freshwater from the Santa Rosa Aquifer. Well No. 461W is permitted to inject a maximum 5,000 bbl/day of salt water, 100 bbl/day of freshwater from the Ogallala Aquifer, and 1,500 bbl/day of freshwater from the Santa Rosa Aquifer.<sup>12</sup> Applicant's counsel indicated that freshwater is used in the waterflood project as "make-up water".

Ms. Casbeer testified that CO<sub>2</sub>-injection is authorized in other injection wells on the Unit (*i.e.*, Well Nos. 113A, 360, 371, and 394).<sup>13</sup> Applicant's counsel indicated that the existing CO<sub>2</sub> injection authority on the Unit is a pilot for a potential tertiary recovery project.

Ms. Casbeer stated that the purpose of the application is to inject the produced gas from OP's production wells on the Unit into the Field. In other words, OP seeks to recycle the produced gas from the Field back into the Field's reservoir. The produced gas is made-of a CO<sub>2</sub>,

<sup>8</sup> Compare testimony at 12:40 of audio recording with OP Exh. No. 2.

<sup>9</sup> OP Exh. No. 5 – Aerial map of the Unit with boundaries.

<sup>10</sup> Testimony at 25:15.

<sup>11</sup> Testimony at 25:35.

<sup>12</sup> OP Exh. Nos. 6, 7, and 8 – Copies of existing injection permits for the wells.

<sup>13</sup> Compare testimony at 21:20 with OP Exh. No. 9. The orange arrows indicate injection wells approved for CO<sub>2</sub> injection. Well Nos. 113A, 360, 371, and 394 are relatively close in proximity to the subject wells essentially surround the subject wells to the north, west, and south directions.

H<sub>2</sub>S, and HC<sub>G</sub>. Therefore, Applicant seeks to amend its existing injection authority for the wells. OP requests authority to inject up to 10 million cubic feet of gas per day (“MMCFD”) for each of the subject wells. In addition, Applicant seeks a maximum surface injection pressure of 2,200 pounds per square inch gauge (“psig”) for liquid material and 3,300 psig for gas material.<sup>14</sup> Ms. Casbeer testified the maximum injection pressures sought are based on the Commission’s injection pressure-gradient guidelines of 0.5 psi per foot for liquids and 0.75 psi per foot for gas. Ms. Casbeer stated that the injection pressure gradients were derived by multiplying the top of the injection interval by each factor.

#### H<sub>2</sub>S Radius of Exposure (ROE) Estimations and Form H-9

Mr. Pete Maciula, OP’s Health, Safety, and Environment Team Leader, testified as a fact witness responsible for the Form H-9, AORs, and Contingency Plan for the subject application. Mr. Maciula stated he has been employed with OP for 34 years, and has served in his current capacity during the past eight years.

Mr. Maciula testified that OP seeks authority to inject H<sub>2</sub>S in the subject wells so that it does not have to shut-in production or flare gas from the Unit.<sup>15</sup> Mr. Maciula stated that OP prefers to inject the produced gas to reduce its environmental footprint, and to prevent waste of gas from the Field.<sup>16</sup>

Each of the production wells on the Unit produces H<sub>2</sub>S-gas from the Field. However, the volume of H<sub>2</sub>S produced is relatively low. Mr. Maciula stated that each production well’s 100 ppm and 500 ppm ROE averages 50’ and 25 feet, respectively.<sup>17</sup> Despite each well’s relatively low volume of H<sub>2</sub>S, once the produced gas is contained within a single pipeline the H<sub>2</sub>S ROEs become significant at each of the subject wells.<sup>18</sup>

Applicant submitted a copy of the Commission-approved June 6, 2014, Form H-9 filed for the Unit. Mr. Maciula stated that the June 6<sup>th</sup> H-9 is aimed at the proposed injection of H<sub>2</sub>S into the subject wells. The June 6<sup>th</sup> H-9 indicates that the Unit will handle H<sub>2</sub>S-laden gas which contains a maximum concentration of 226,000 ppm. Mr. Maciula testified that the maximum concentration of H<sub>2</sub>S was provided to him by OP’s Engineering Staff.

Mr. Maciula testified that the estimated maximum escape volume of gas is 2,000 MCFGD. Based on the maximum escape volume, the 100 ppm and 500 ppm ROEs are estimated to extend up to 4,622’ and 2,112’ from each of the subject wells.<sup>19</sup>

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<sup>14</sup> Compare testimony at 31:30 with OP Exh. No. 11, Item No. 30.

<sup>15</sup> Testimony at 46:50.

<sup>16</sup> Testimony at 1:12:00.

<sup>17</sup> Testimony at 58:30.

<sup>18</sup> OP Exh. No. 19 – Aerial map of the pipeline infrastructure which gathers produced gas from production wells on the Unit and transports said gas to the subject wells for injection.

<sup>19</sup> OP Exh. No. 20 – Aerial map indicating the radial extent of the 100 ppm and 500 ppm ROEs for the of the subject wells. This exhibit shows the overall perimeter for the four subject wells instead of depicting each well’s individual ROEs.

H2S Contingency Plan

Applicant submitted a copy of its H2S Contingency Plan for the Unit, which was revised on May 5, 2014.<sup>20</sup> Mr. Maciula testified the May 5<sup>th</sup> Contingency Plan was revised to account for the existence of the subject wells, the resulting ROEs, and the gas distribution lines.<sup>21</sup> Furthermore, Mr. Maciula testified that the May 5<sup>th</sup> Contingency Plan was not revised due to the subject application's resulting changes in public safety because attributes involving public safety were already covered in a prior Contingency Plan.<sup>22</sup>

In conclusion, Mr. Maciula testified that OP takes great care to ensure that its operations are conducted to meet the requirements of Statewide Rule 36, and in many instances exceeds the minimum requirements of Statewide Rule 36.<sup>23</sup>

Injection Interval and Well Construction (Drilling, Casing, Cementing, and Completion)

Mr. Matthew Kanitz, a Facilities Staff Engineer with OP, testified as a fact witness with regard to operations on the Unit.

Mr. Kanitz testified that since the Field was unitized in 1961, the Unit has undergone injection of produced water and make-up water. The purpose of utilizing make-up water is to replace the volumetric space previously occupied by liquid hydrocarbons in the reservoir in order to maintain a sufficient reservoir pressure for continual hydrocarbon production. Furthermore, make-up water is a more economically-viable option compared to other liquid types.<sup>24</sup>

The existing injection interval for the Unit spans a correlative interval from 4,400 feet to 5,000 feet below the surface. In the instant case, OP does not request to amend the injection interval. Mr. Kanitz sponsored a type log prepared by one of OP's Staff Geologists.<sup>25</sup> Mr. Kanitz testified that the Unit's unitized interval includes the entire Grayburg Formation.

Applicant submitted a copy of wellbore diagrams for each of the subject wells.<sup>26</sup> Each of the wells is completed with 8-5/8" surface casing, 5-1/2" long-string casing, tubing, and a retrievable packer. Beyond that, each mentioned casing string is enveloped in cement from its respective setting depth to the ground surface. Mr. Kanitz testified that generally the subject wells are completed in a manner which complies with the Commission's casing and cementing rules. With regard to equipment used in each well, Mr. Kanitz stated that the wells will comply with the applicable provisions of Statewide Rule 36.<sup>27</sup> For example, Statewide Rule 36 provides that operators meet the minimum standards of the National Association of Corrosion Engineers (NACE) MR-01-75, which aim to prevent sulfide-stress cracking of susceptible materials.<sup>28</sup>

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<sup>20</sup> OP Exh. No. 21.

<sup>21</sup> Testimony at 1:07:55.

<sup>22</sup> Testimony at 1:08:07.

<sup>23</sup> Testimony at 1:10:00.

<sup>24</sup> Testimony at 1:13:50.

<sup>25</sup> OP Exh. No. 22.

<sup>26</sup> OP Exh. No. 23.

<sup>27</sup> See 16 Tex. Admin. Code §3.36(c)(6)(C).

<sup>28</sup> Testimony at 1:16:40.

The Unit has produced over 100 million barrels of stock tank oil (“100 MMSTBO”) from the Field through its primary phase of production and just under 87 MMSTBO during its waterflood operation.<sup>29</sup> Since its inception the Unit has produced approximately 187 MMSTBO leading up to the hearing. Mr. Kanitz stated that the Unit currently produces roughly 1,800 STBO per day. Although OP seeks to inject a maximum gas volume of 10 MMCFGD, the Unit only produces between and 600-800 MCFD. Mr. Kanitz testified that the disparity between the Unit’s daily produced volume of gas and OP’s requested maximum daily injection volume is to offer it flexibility in the event OP wishes to pursue a tertiary recovery project (*i.e.*, CO<sub>2</sub> flood).<sup>30</sup>

From a general standpoint, the Unit’s production wells span across the Field. Mr. Kanitz stated that each of the production wells is tied to a “satellite” tank battery, where the wells’ production is separated to break out flash gas (*i.e.*, gas liberated from oil due to reductions in temperature and pressure) from the liquid production. Subsequently, the flash gas is routed to a gas sales pipeline. After that, the liquids contained at each satellite tank battery are routed by a trunkline network to the Unit’s Central Tank Battery, where final separation of oil, water, and gas occurs. Each tank battery is equipped to flare gas. Mr. Kanitz testified that the cumulative produced gas contains 22.6 percent H<sub>2</sub>S, or 226,000 ppm.<sup>31</sup> The maximum daily escape volume (*i.e.*, 2,000 MCFGD) incorporated in OP’s June 6<sup>th</sup> H-9 (OP Exh. No. 17) was based on the Unit’s total daily gas production between January 2012 through May 2014.

The Unit’s produced gas is sold to a third-party company, DCP Midstream. During April 2014 the Unit experienced a decline in production due to a shut-down of DCP Midstream’s gas plant. Mr. Kanitz testified that because of the shut-down of DCP Midstream’s facility, OP opted to seek the relief requested in the immediate case to avoid any similar shut-down event in the future. Finally, Mr. Kanitz opined that if a future shut-down occurred over a substantial time period, then OP could potentially risk the loss of millions of barrels of oil.<sup>32</sup> Mr. Kanitz testified that once the Field is shut-down, it costs OP approximately \$1,000,000 to re-start production and that by being able to inject the produced gas from the Unit, OP removes the risk of shutting-down the Field.<sup>33</sup>

### **FINDINGS OF FACT**

1. Pursuant to 16 Texas Administrative Code §§3.36 (“Statewide Rule 36”) and 3.46 (“Statewide Rule 46”), Occidental Permian, Ltd. (“Applicant or OP”) seeks a non-commercial injection permit for its Midland Farms Unit (“Unit”), Well Nos. 366W (API No. 42-003-30203), 382A (API No. 42-003-38810), 392W (API No. 42-003-31058), and 461W (API No. 42-003-31955) (“subject wells” or “wells”) to dispose of oil and gas waste.
2. Applicant seeks a non-commercial injection permit for the subject wells to dispose of up to 10,000,000 cubic feet of gas per day (“10 MMCFGD”), which contains up to 226,000

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<sup>29</sup> OP Exh. Nos. 25

<sup>30</sup> Testimony at 1:23:00.

<sup>31</sup> Compare OP Exh. No. 27 with testimony at 1:27:30.

<sup>32</sup> OP Exh. No. 29.

<sup>33</sup> Testimony at 1:36:00.

parts per million of hydrogen-sulfide (“H<sub>2</sub>S”). The remainder of the total 10 MMCFG is made of carbon-dioxide (“CO<sub>2</sub>”) and natural gas (“HC<sub>G</sub>”).

3. Notice of the application was made pursuant to Statewide Rule 46.
4. The subject application is unopposed, and requires a public hearing pursuant to Statewide Rule 36(c)(10).
5. Statewide Rule 36 does not require notice to persons for an application pursuant to Statewide Rule 36(c)(10).
6. Statewide Rule 36(c)(10) does not stipulate any technical requirements for an Applicant to fulfill in order to be granted authority to inject H<sub>2</sub>S.
7. Applicant’s subject application was rendered administratively complete by the Railroad Commission’s Oil and Gas Division on April 28, 2014.
8. Applicant’s injection interval in each of the subject wells is limited to the depth intervals listed on OP’s Exhibit Number 1, Form H-1A, Item Numbers 23, respectively.
9. The gas to be disposed of in each subject well originates as sour casinghead gas from the subject field.
10. The gas to be disposed of in each subject well will be collected from OP’s production wells on the Midland Farms Unit (“Unit”) and piped for injection to the subject wells.
11. Operation of the subject wells will provide OP a means of disposal of H<sub>2</sub>S and CO<sub>2</sub>.
12. Each of the subject wells’ 100 and 500 part per million radii of exposures were calculated to extend no further than 4,622 feet and 2,122 feet, respectively, from each subject well based on a maximum escape volume of 2,000,000 cubic feet of gas per day.
13. Approval of the application is reasonable pursuant to Statewide Rules 36 and 46.

#### **CONCLUSIONS OF LAW**

1. On May 8, 2014, the Commission provided Notice of Application for the subject application in accordance with 16 Texas Administrative Code §3.46.
2. All things have occurred to give the Railroad Commission jurisdiction to consider this matter.
3. Approving Applicant’s request to inject hydrogen-sulfide, carbon-dioxide, natural gas, fresh water, produced water, and polymer material, as proposed by Occidental Permian, Ltd., will prevent waste and protect correlative rights.

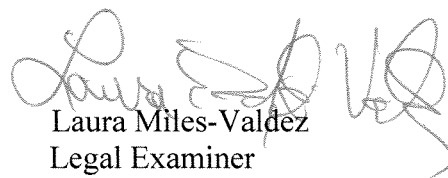


**EXAMINERS' RECOMMENDATION**

The Examiners recommend that Occidental Permian, Ltd.'s application for its proposed injection authority in the Midland Farms Unit, Well Nos. 336W, 382A, 392W, and 461W be APPROVED.



Brian Fancher, P.G.  
Technical Examiner



Laura Miles-Valdez  
Legal Examiner